Name:

at1118paper: Complete the Square (v407)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 54x = -440$$

Add $\left(\frac{-54}{2}\right)^2$, which equals 729, to both sides of the equation.

$$x^2 - 54x + 729 = 289$$

Factor the left side.

$$(x - 27)^2 = 289$$

Undo the squaring. We need to consider both $\pm\sqrt{289}$.

$$x - 27 = -17 \quad \text{or} \quad x - 27 = 17$$
$$x = -44 \quad \text{or} \quad x = -10$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 56x = -159$$

$$x^2 + 56x + 784 = 625$$
$$(x + 28)^2 = 625$$
$$x + 28 = \pm 25$$
$$x = -53 \quad \text{or} \quad x = -3$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 6x = 616$$

$$x^2 - 6x + 9 = 625$$
$$(x - 3)^2 = 625$$
$$x - 3 = \pm 25$$
$$x = -22 \quad \text{or} \quad x = 28$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 18x = 1008$$

$$x^2 - 18x + 81 = 1089$$
$$(x-9)^2 = 1089$$
$$x - 9 = \pm 33$$
$$x = -24 \quad \text{or} \quad x = 42$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 28x = 380$$

$$x^2 + 28x + 196 = 576$$
$$(x+14)^2 = 576$$
$$x + 14 = \pm 24$$
$$x = -38 \quad \text{or} \quad x = 10$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 - 48x = 265$$

$$x^2 - 48x + 576 = 841$$
$$(x-24)^2 = 841$$
$$x - 24 = \pm 29$$
$$x = -5 \quad \text{or} \quad x = 53$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 42x = 184$$

$$x^2 + 42x + 441 = 625$$
$$(x+21)^2 = 625$$
$$x + 21 = \pm 25$$
$$x = -46 \quad \text{or} \quad x = 4$$